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MEHMOOD, SEHAR BEENA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,418	MO, SEUNG-KEE	
	Examiner	Art Unit	
	SEHAR MEHMOOD	4118	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/30/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: pg 20, line 6: a space between "160" and "include" is needed.

Appropriate correction is required.

Claim Objections

2. Claim 6, line 6 and 10 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said electric charge" is recommended to be changed to "the electric charge." Appropriate correction is required.

3. Claim 7, line 14 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said apparatus" is recommended to be changed to "the apparatus." Appropriate correction is required.

4. Claim 8, line 19 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said capacitor section" is recommended to be changed to "the capacitor section." Appropriate correction is required.

5. Claim 9, line 5 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said

switching element" is recommended to be changed to "the switching element." Appropriate correction is required.

6. Claim 9, line 7 is objected to because of the following informalities: "in parallel one another" should be replaced with, "in parallel *with* one another." Appropriate correction is required.

7. Claim 10, line 10 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said input switch section" and "said shunt switch section" are recommended to be changed to "the input switch section" and "the shunt switch section." Appropriate correction is required.

8. Claim 11, line 16/7 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said output switch section" is recommended to be changed to "the output switch section." Appropriate correction is required.

9. Claim 13, line 5 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said input switch section," "said output switch section," and "said shunt switch section" are recommended to be changed to "the input switch section," "the output switch section," and "the shunt switch section." Appropriate correction is required.

10. Claim 17, line 8 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said steps" is recommended to be changed to "the steps." Appropriate correction is required.

11. Claim 18, line 15/16 is objected to because of the following informalities: consistency between the usage of "the" and "said" for antecedent basis is recommended. In this instant, "said steps" is recommended to be changed to "the steps." Appropriate correction is required.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 1, 3-5, 7, 10, 16, 17, 19-21, 24, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. Claim 1 recites the limitation "the received AC voltage" in line 6. There is insufficient antecedent basis for this limitation in the claim.

15. Claim 1 recites the limitation "the accumulation of electric charge" in line 11. There is insufficient antecedent basis for this limitation in the claim.

16. Claim 3 recites the limitation "the DC voltage full-wave" in line 15. There is insufficient antecedent basis for this limitation in the claim.

17. Claim 4 recites the limitation "the output AC voltage" in line 18. There is insufficient antecedent basis for this limitation in the claim.

18. Claim 5 recites the limitation "the voltage" in line 1. There is insufficient antecedent basis for this limitation in the claim. Recommended change is to specify which voltage is being referred to.

19. Claim 7 recites the limitation "said apparatus" in line 14. There is insufficient antecedent basis for this limitation in the claim. Recommended change is “the apparatus for creating pulse magnetic stimulation.

20. Claim 10 recites the limitation "the received AC voltage" in line 14. There is insufficient antecedent basis for this limitation in the claim.

21. Claim 16 recites the limitation "the received AC voltage" in line 5 on page 52. There is insufficient antecedent basis for this limitation in the claim.

22. Claim 16 recites the limitation "the converted AC voltage" in line 7 on page 52. There is insufficient antecedent basis for this limitation in the claim.

23. Claim 16 recites the limitation "the basis of the current" in line 17 on page 52. There is insufficient antecedent basis for this limitation in the claim.

24. Claim 17 recites the limitation "the basis of a magnitude" in line 11. There is insufficient antecedent basis for this limitation in the claim.

25. Claim 19 recites the limitation "the burst on period" in line 20 on page 53 and in line 2 on page 54. There is insufficient antecedent basis for this limitation in the claim. Recommended change is “the predetermined burst on period."

26. Claim 20 recites the limitation "the pulse on time and the pulse off time" in line 7. There is insufficient antecedent basis for this limitation in the claim.

27. Claim 21 recites the limitation "the power supplying unit" in line 16. There is insufficient antecedent basis for this limitation in the claim.

28. Claim 24 recites the limitation "the unit" in line 11. There is insufficient antecedent basis for this limitation in the claim. Recommended change is “the magnetic flux emitting unit.”

29. Claim 26 recites the limitation "permeability of materials" and "the central stratiform iron core" in line 8. There is insufficient antecedent basis for this limitation in the claim.

30. Claim 26 recites the limitation "the peripheral stratiform iron core" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

31. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

32. Claims 1, 6, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Cadwell (US 4,940,453).

33. Regarding Claim 1, Cadwell discloses an apparatus for creating pulse magnetic stimulation, in which pulse current is generated to create magnetic flux, the apparatus comprising:

- a driving voltage supplying section (power supply 51, Figure 6);
- a capacitor section (capacitor bank 57, Figure 6);
- an input switch section (power switch 55, Figure 6);
- a coil (stimulator coil 59, Figure 6) connected in series to the capacitor section;
- an output switch section (power switch 55, Figure 6); and
- a shunt switch section (power switch 55, Figure 6).

34. Regarding Claim 6, Cadwell discloses when electric charge has been completely accumulated in the capacitor section (capacitor bank 57), the input switch section is switched off and the output switch section is switched on (power switch 55), and wherein it is determined by means of capacitance (Col 3, line 44) of the capacitor section whether said electric charge has been completely accumulated in the capacitor section or not (Col 9, lines 22-29).

35. Regarding Claim 12, Cadwell discloses a waveform of the pulse current as being a sine wave (Col 21, line 39, ""the capacitor bank discharge causes a sinusoidal current flow through the coil").

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Claim Rejections - 35 USC § 103

36. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

37. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

38. Claims 2, 4, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell in view of Silvian et al. (US 6,522,920), further in view of Groux (US 5,913,836).

39. Re Claim 2 and 14, Cadwell discloses all of the claimed elements except for the variable regulator, transformer, and rectifying section. Silvian et al. teaches the transformer (transformer 160) and rectifying section (rectifier diode D1) (Col 9, lines 7-10) in order to convert AC voltage into DC voltage. Additionally, Groux teaches the use of a variable voltage regulator U2 and U3 to change input voltage into a desired output voltage (Col 5, lines 36-39). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell to include a variable voltage regulator, transformer, and rectifying section, as taught by Silvian et al. and Groux, for the purpose of converting AC voltage from a voltage source into DC voltage to supply the capacitor/capacitor section with electric charge and thus to the coil to produce magnetic flux.

40. Re Claim 4, Cadwell discloses all of the claimed elements except for a variable regulator and the variable regulator adjusting a magnitude of the output AC voltage. Groux teaches the usage of variable voltage regulators U2 and U3. Silvian et al. teaches a programmable microcontroller 60, part of the stimulation device 10, that processes or monitors input signals (data) as controlled by a program code stored in its memory. Since the magnitude of the AC voltage outputted from the variable regulator is determined by a control section, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cadwell to include a variable voltage regulator and microprocessor, as taught by Groux and Silvian et al., in order to adjust the magnitude of the output AC voltage before the AC voltage enters the transformer.

41. Claims 5, 7, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell in view of Silvian et al. (US 6,522,920).

42. Re Claim 5, Cadwell discloses all of the claimed elements except for the state that the shunt switch section is on and the output switch section is off, thereby resulting in the magnetic energy and the voltage being lowered in to the ground level. Silvian et al. teaches a switch back 74, which connected in the circuitry, provides an I/O circuit (Col 6, lines 45-47; Figure 2). With an I/O circuit, one can switch various switches on and off to achieve various results, such as lowering the magnetic energy and the voltage into the ground level. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell to include a switch bank/multiple switches, as taught by Silvian et al., for the purpose of having appropriate switches opened (turned on) and closed (turned off) to create a state so that the magnetic energy and voltage can be lowered into the ground level.

43. Re Claim 7, Cadwell discloses all of the claimed elements except for a power monitoring section. Silvian et al. teaches a noninvasive telemetry system that allows data and commands to be readily transmitted between an implantable device and an external programmer (Col 1, lines 45-47), which can be used to collect and calculate data on current and its magnitude to detect an error of a large power signal. Additionally, the microprocessor 60, which is used to process or monitor input signals/data (e.g. magnetic flux generated) can also be used to calculate the magnitude of current using magnetic flux generated due to the current flowing through the coil to detect an error of a large power signal. Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to modify Cadwell to include a power monitoring section, such as a noninvasive telemetry system or microprocessor, as taught by Silvian et al., for the purpose of calculating various data, including the calculation of the magnitude of current to detect an error of a large power signal.

44. Re Claim 13, Cadwell discloses all of the claimed elements except for the input/output/shunt switch sections being a relay or thyristor or an Insulated Gate Bipolar Transistor (IGBT). Silvian et al. teaches one kind of switching elements can be an IGBT (Col 2, lines 6-8/63-64). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell and use an IGBT as a switching element, as taught by Silvian et al., for the purposes of using a common switching element for the switches.

45. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell/Silvian et al./Groux in view of Halfhill (US 3,826,927).

46. Re Claim 3, Cadwell/Silvian et al./Groux discloses all of the elements except for a filtering section for smoothing the DC voltage full-wave. Halfhill teaches a wave generator utilizing feedback circuits to generate smooth waves from an input signal (e.g. voltage wave form) (Col 2, lines 39-43). Therefore, it would be obvious to one skilled in the art at the time of the invention was made to modify Cadwell/Silvian et al./Groux to include a wave generator/filtering section, as taught by Halfhill, in order to smooth the DC voltage full-wave.

47. Claim 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell in view of Ishikawa et al. (US 5,984,854).

48. Re Claim 8, Cadwell discloses all of the claimed elements, including capacitors being in parallel to one another and in series with a coil (Col 3, lines 49-51), except for switching elements being in series with the capacitors. Ishikawa et al. teaches the usage of a switching control circuit 17 to provide for magnetic stimulation pulses. When the switch is closed charge builds up on the capacitors. Once the capacitors are fully charged the switches can be opened. Opening the switches allows for the capacitors to discharge and current to flow in the circuit.

The current flows through the coil and produces magnetic simulation pulses or magnetic flux. Therefore, it would be obvious to one skilled in the art at the time the invention was made to modify Cadwell to put switches in series with each parallel capacitor, as taught by Ishikawa et al., in order to control the charging/discharging of the capacitors and thereby affecting magnetic flux generated in the coil.

49. Re Claim 9, Cadwell discloses all of the claimed elements except for the on or off states of switching elements being controlled to change a value of capacitance. Ishikawa et al. teaches the usage of a switching control circuit 17, which controls switching of thyristors based on charge-discharge sequence. Since thyristors are the switching elements, the switching control circuit 17, can control the value of capacitance on the capacitors in parallel to each other, and in series to switching elements. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell to include the switching control circuit 17 to control the switching elements in series to the capacitors in parallel to each other, as taught by Ishikawa et al., in order to change the value of capacitance.

50. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell in view of Davey et al. (US 5,725,471).

51. Re Claim 10, Cadwell discloses all of the claimed elements except for the apparatus being an RLC serial resonant circuit. Davey et al. teaches that a circuit for generating magnetic flux containing the same circuit components as an LC circuit (Col 6, line 31). It is obvious to one skilled in the art, that designing a circuit for generating magnetic flux is a RLC serial resonant circuit can be achieved with multiple switches, which switch on and off such that when the input switch section and shunt switch section are switched off and the output switch section

is switched on, the capacitor section and coil constitute an RLC serial resonant circuit and each parameter value of the circuit satisfies an under-damping condition.

52. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell/Davey et al. in view of Ishikawa et al. (US 5,984,854).

53. Re Claim 11, Cadwell discloses all of the claimed elements except the output switch section being switched on and off every one or a half period of the RLC serial resonant circuit, and the period being less than 1kHz. Ishikawa et al. teaches that a switch can be switched on and off at a predetermined frequency, thereby generating magnetic fluxes around coil (Col 3, line 5-7). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell so that the switches are switched on and off at a predetermined frequency, such as 1kHz, as taught by Ishikawa et al., in order to create pulse magnetic stimulation.

54. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell/Silvian et al./Groux in view of Ishikawa et al.

55. Re Claim 15, Cadwell/Silvian et al./Groux disclose all of the claimed elements, including capacitors being in parallel to one another and in series with a coil (Col 3, lines 49-51), except for switching elements being in series with the capacitors. Ishikawa et al. teaches the usage of a switching control circuit 17 to provide for magnetic stimulation pulses. When the switch is closed charge builds up on the capacitors. Once the capacitors are fully charged the switches can be opened. Opening the switches allows for the capacitors to discharge and current to flow in the circuit. The current flows through the coil and produces magnetic simulation pulses or magnetic flux. Therefore, it would be obvious to one skilled in the art at the time the invention was made

to modify Cadwell to put switches in series with each parallel capacitor, as taught by Ishikawa et al., in order to control the capacitance charged/discharged in the capacitors and thereby affecting the magnetic flux generated in the coil.

56. Claims 16-19, 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell/Silvian et al. in view of Ishikawa et al.

57. Re Claim 16, Cadwell discloses a method of supplying a pulse current to generate magnetic stimulation, comprising:

- (c) a step in which when an input switch section is switched on, a capacitor section accumulates electric charge corresponding to the DC voltage (Col 9, lines 22-25: "when the power switch circuit is open, regulated DC is applied to the capacitor bank 57 resulting in the capacitor bank being charged);
- (e) a step of allowing a current to flow in a coil, the current being generated due to a both-end voltage corresponding to the electric charge accumulated in the capacitor section (Col 9, lines 25-27: "When the switch element is closed, the capacitor bank is discharged through the magnetic stimulator coil 59");
- (f) a step in which the coil generates magnetic flux on the basis of the current (Col 9, lines 27-28: "As a result, the magnetic stimulator coil 59 creates a magnetic field…");

except for a step of inputting an operation start instruction to an apparatus for creating pulse magnetic; a step in which a power supplying section receives an AC voltage from a voltage source and converts the received AC voltage into an output AC voltage having a predetermined magnitude; a step in which a rectifying section converts the converted AC voltage into a DC voltage; a step of switching off the input switch section and switching on an output switch

section, when the capacitor section has completely accumulated the electric charge; a step of switching on a shunt switch section after a predetermined period time; a step of switching off the output switch section and switching on the input switch section, when magnetic energy stored in the coil and voltage accumulated in the capacitor section is lowered into a ground level; and a step of repeating the steps (a) to (h) until an operation end instruction is inputted to the apparatus for creating pulse magnetic stimulation, or a predetermined burst on period expires.

However, Silvian et al. teaches a method of supplying a pulse current to generate magnetic stimulation, comprising:

- a step of inputting an operation start instruction to an apparatus for creating pulse magnetic stimulation (Silvian et al., Col 1, lines 46-49: use of the noninvasive telemetry system to input command);
- (b) a step in which a rectifying section converts the converted AC voltage into a DC voltage (Col 9, lines 7-9; "rectifier diode D1…to rectify the output of transformer 160, resulting in a DC voltage…);
- (d) a step of switching off the input switch section and switching on an output switch section, when the capacitor section has completely accumulated the electric charge (switch bank 74);
- (h) a step of switching off the output switch section and switching on the input switch section, when magnetic energy stored in the coil and voltage accumulated in the capacitor section is lowered into a ground level (switch bank 74: see claim 5); and
- a step of repeating the steps (a) to (h) until an operation end instruction is inputted to the apparatus for creating pulse magnetic stimulation (Col 1, lines 46-49: use of the

noninvasive telemetry system to input command), or a predetermined burst on period expires.

except for a step in which a power supplying section receives an AC voltage from a voltage source and converts the received AC voltage into an output AC voltage having a predetermined magnitude and a step of switching on a shunt switch section after a predetermined period time;

Cadwell and Silvian et al. teach a method of supplying a pulse current to generate magnetic stimulation, comprising: (a) a step in which a power supplying section receives an AC voltage from a voltage source and converts the received AC voltage into an output AC voltage having a predetermined magnitude (Cadwell, Col 9, lines 51-52 + Silvian et al., microcontroller 60 (see claim 4));

except for (g) a step of switching on a shunt switch section after a predetermined period time (Ishikawa, Col 3, lines 5-6: switches can be turned on and off at a predetermined frequency (period = 1/frequency));

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to modify the claimed steps in Cadwell to include the steps above, as taught by Silvian et al., to have the circuit operate in the desired manner of converting AC current to provide DC current to the coil via parallel capacitors and switches for the purpose of producing magnetic flux.

However, Ishikawa et al. teaches a method of supplying a pulse current to generate magnetic stimulation, comprising: (g) a step of switching on a shunt switch section after a predetermined period time (Ishikawa, Col 3, lines 5-6: switches can be turned on and off at a predetermined frequency (period = 1/frequency));

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to modify the claimed steps in Cadwell/Silvian et al. to include the above step, as taught by Ishikawa et al., in addition to the existing circuit to control the magnetic pulse stimulation, and thus the magnetic flux flowing from the coil.

58. Re Claim 17, Silvian et al. also teaches the use of a microcontroller 60, which includes the ability to process data and analyze data, which can include determining the magnitude of voltage to be stored in the capacitor section on the basis of the magnitude of an output AC voltage from the variable regulator. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method to include a microcontroller, as taught by Silvian et al., in the circuit design to determine the magnitude of voltage to be stored n the capacitor section on the basis of the magnitude of an output AC voltage from the variable regulator.

59. Re Claim 18, Cadwell also teaches "the power supply control circuit 63 controls the power supply such that charge current flows to the capacitor bank via the regulator when the power switch is open and charge current does not flow when the power switch is closed (Col 9, lines 53-57). Furthermore, "when the switch element is closed, the capacitor bank is discharged through the magnetic stimulator coil 59 (Col 9, lines 25-27)." Moreover, Silvian et al. teaches the use of a switch bank 74, which can be used to control the pulse off and pulse on state. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method to apply the switch bank, as taught by Silvian et al., to the concept taught by Cadwell, in order to have current flow through the coil during a pulse on state of steps

16 (e)-(h), and not have current flow through the coil during the pulse off state of steps 16 (a)-(d).

60. Re Claim 19, Cadwell also teaches an induced voltage being generated and the burst on period comprising a stimulation ramp-up period, stimulation maintenance period, and stimulation ramp-down period. When the capacitor bank discharges, a sinusoidal current flow passes through the coil (Cadwell, Col 21, lines 38-39). Since current is related to voltage (I = V/Z), voltage is induced, which is also sinusoidal (Figure 12). Along with the current, the induced voltage generates a stimulation, which reflects the sinusoidal pattern, which contains a stimulation ramp-up period, stimulation maintenance period, and stimulation ramp-down period.

61. Re Claim 21, Cadwell/Silvian et al./Ishikawa et al. disclose all of the claimed elements from Claim 19. Silvian et al. teaches the use of switch bank 74 and microcontrollers 60, and by designing the circuit to include elements such as the switch bank 74 or microcontrollers 60, the stimulation ramp-up period can correspond to the gradual increase in magnitude of the output AC voltage converted by the variable regulator of the power supplying section, the stimulation maintenance period can correspond to the constant maintenance of the magnitude of the output AC voltage, and the stimulation ramp-down period can correspond to the gradual decrease in the magnitude of the output AC voltage. The output AC voltage converted by the variable regulator of the power supplying section is sinusoidal (i.e. alternating current) and the switch bank and microcontroller can be programmed so that the changes in the stimulation period corresponds to the changes in magnitude of the output AC voltage converted by the variable regulator of the power supplying section.

62. Re Claim 22 and 23, Silvian et al. teaches the usage of a noninvasive telemetry system that allows for data and commands to be readily transmitted between an implantable device and an external programmer. Using a modulation mode, such as ramp modulation or phase modulation (or PM carrier wave) or duration modulation or timing modulation or amplitude modulation (or AM carrier wave) or frequency modulation (or FM modulation) or duty modulation, provides a way for data and commands to be transmitted from the apparatus for creating pulse magnetic stimulation and an external device.

63. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cadwell/Silvian et al./ Ishikawa et al. in view of Kraus (US 3,915,151).

64. Re Claim 20, over Cadwell/Silvian et al./ Ishikawa et al. discloses all of the claimed elements except for the apparatus for creating pulse magnetic stimulation being able to vary a modulation period, corresponding to a period of a pulse on time and a pulse off time by varying the pulse of time. Kraus teaches the use of a function generator to control the frequency of the AC or the AC component of the coil current (Col 2, lines 42-47). Varying the frequency of the current is varying period of current (period = 1/frequency), and varying the period of the current affects the opening and closing of the switches. In turn, the pulse on and pulse off time varies. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Cadwell/Silvian et al./ Ishikawa et al., to include a function generator, as taught by Kraus, in order to vary the current, and thus the modulation period by varying the pulse off time.

65. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al. (US 5,984,854) in view of Ishikawa et al. (US 6,527,694).

66. Re Claim 24, Ishikawa et al. (US 5,984,854) discloses a magnetic flux emitting unit for externally emitting magnetic flux generated from a coil in a stimulation apparatus having a resonant circuit comprising the coil, a resistor and a capacitor, the apparatus generating a pulse current to create the magnetic flux, the unit comprising:

- the coil (coils 12, Figure 2);
- a case having a disk shape surrounding the coil (disk-form housing 10, Figure 2) ;
- a grip projected from a lower portion of the case (handle 29, Figure 2); and
- a lead line coupled to the coil and penetrating through the case and the grip (lead wires 5a and 5b, Figure 2),

except for the coil being a single-layer solenoid shape, the case having a plurality of air holes for cooling heat generated from the coil, and the case having an insulating feature.
However, Ishikawa et al. (US 6,527,694) teaches the coil being a single-layer solenoid shape (Col 2, lines 9-10, "coil is a solenoid coil"), the case having a plurality of air holes for cooling heat generated from the coil in an air cooling manner (Col 2, lines 24-29; Airway 12a and 13a), and the case having an insulating feature (Col 2, lines 3-4; "Box 10 is electrically insulative and nonmagnetic"). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Ishikawa et al. (US 5,984,854) to form the coil in a solenoid shape and design the case so that it has an insulating feature and has a plurality of air holes, as taught by Ishikawa et al. (US 6,527,694), in order to utilize the advantage of creating a straight magnetic field that results from a solenoid shape and to keep the coils cool and to prevent a patient from burning.

67. Claims 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al. (US 5,984,854/ US 6,527,694) in view of Kraus (US 3,915,151).

68. Re Claim 25, Ishikawa et al. (US 5,984,854/ US 6,527,694) discloses all of the claimed elements except for a magnetic flux focusing unit couple to the case, and a stratiform iron core. Ishikawa et al. (US 5,984,854) discloses a coolant (Col 5, line 1-7; water cooling apparatus 4 + insulated water feed pipe 13, 4a + water discharge pipe 4b). Kraus teaches a magnetic flux focusing unit (Figure 1) and a rodshaped ferrite core (Col 4, lines 20-22, "receiving coil 24 of a rodshaped ferrite core, on which a solenoid winding is arranged"). Since stratiform indicates having layers (thus, stratiform iron core implies an iron core with different iron/iron alloys) and ferrite also can refer to iron and its alloys, it would have been obvious to one skilled in the art at the time the invention was made to modify Ishikawa et al. (US 5,984,854/ US 6,527,694) to include a magnetic flux focusing unit and a stratiform iron core, as taught by Kraus, so that the magnetic flux from the magnetic flux emitting unit is focused to a direct area and so that the magnetic flux is changed (i.e. increase or decrease the magnetic flux) throughout the coil.

69. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al. (US 5,984,854/ US 6,527,694)/Kraus in view of Davey et al. (US 5,725,471) and Takada et al. (US 4,385,339).

70. Re Claim 26, Ishikawa et al. (US 5,984,854/ US 6,527,694)/Kraus disclose all of the claimed elements, including the coolant and the permeability of material of the central stratiform iron core being larger than the permeability of material of the peripheral stratiform iron core (i.e. if the iron core is comprised of different alloys in different sections, then an inherent property would be that the permeability of materials would differ for each iron alloy. Furthermore, the

iron core has to be designed such that the peripheral section has a smaller permeability than the central section), except for the stratiform iron core being disposed in parallel to the coil and the end portion of the stratiform iron core from which the magnetic flux is emitted is formed to have a toy top shape. Davey et al. teaches the core 2 being in parallel to the coil 4 (Figure 1), and Takada et al. teaches the toy top (Col 2, lines 42-45, "…end portion 13 of the fixed iron core 12 tapered"). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Ishikawa et al. (US 5,984,854/ US 6,527,694)/Kraus to design the solenoid so that the stratiform iron core is in parallel to the coil, as taught by Davey et al., and to give a toy top/tapered end to the stratiform iron core, as taught by Takada et al., in order to magnify the magnetic field throughout the length of the core and coil; and in order to make the end surface of the iron core small for controlling magnetic force.

Conclusion

71. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsutani (US 4,875,485 A), Bouldin et al. (US 6,149,577 A), Moritz et al. (US 6,450,940 B1), and Davey et al. (US 6,527,695 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEHAR MEHMOOD whose telephone number is (571)270-7857. The examiner can normally be reached on Monday-Friday 9am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quang Thanh can be reached on (571)272-4982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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